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10/731,354	12/09/2003	Frank Liu	18102	3558

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EXAMINER	
FLORES, LEON	
ART UNIT	PAPER NUMBER
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/731,354	LIU, FRANK	
	Examiner	Art Unit	
	Leon Flores	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☒ Claim(s) *21 and 26-32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/6/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 21, 26-32 are objected to because of the following informalities:

In claim 21, line 1, the limitation "the method of claim 20" should be rewritten as "the apparatus of claim 20" in order to avoid any confusion.

In claims 26-32, in line 1, the limitation "the apparatus of claim" should be rewritten as "the transmitter of claim" in order to be consistent.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The claimed invention lacks patentable utility because in claims 1 & 17 the applicant does not disclose neither an utility nor an application. Therefore, claims 1-6 & 17-23 are rejected due to lack of utility.

The interim guidelines states:

"The claimed invention as a whole must be useful and accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more

than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96 (1966)); In re Fisher, 421 F.3d 1365, 76 USPQ2d 1225 (Fed. Cir. 2005); In re Ziegler, 992 F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)).

For the purpose of art consideration on the merits, this claim will be construed as containing an utility.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims (1-5 & 12-23) are rejected under 35 U.S.C. 102(b) as being anticipated by Wildhagen (EP 0940958 A1).

Re claim 1, Wildhagen discloses a method for the processing of an electromagnetic input signal comprising the steps of: producing a bounded phase signal from said input signal (See fig. 10: the output of element 4 & paragraph 5); and producing an unwrapped phase difference signal from said bounded phase signal. (See fig. 10: the output of element 7 & paragraphs 7-8 & see fig 1: the output of element 6.)

Re claim 2, Wildhagen further discloses that wherein said bounded phase signal is produced by using a CORDIC processor to produce a wrapped phase signal that is an n-bit 2's compliment number in the range of [- 1, 1] as said bounded phase signal. (See paragraph 6. Furthermore, it is inherent that the most CORDIC processor performs the operation of scaling the phase signal to produce a signal that is bounded in the neighborhood of $[-\Pi,\Pi)$ or [-1, 1] if scaled or divided or normalized by Π.)

Re claim 3, Wildhagen further discloses that wherein said unwrapped phase difference signal is produced by taking a 2's compliment subtraction using said bounded phase signal. (See paragraph 7. Furthermore, when wrapped phase signal is within $[-\Pi,\Pi)$ or [-1, 1], then the wrapped signal is equal to the unwrapped phase signal, as cited in paragraph 22.)

Re claim 4, Wildhagen further discloses correcting said bounded phase signal to produce a corrected phase signal. (See paragraph 9)

Re claim 5, Wildhagen further discloses that wherein said bounded phase signal is a wrapped phase signal that is an n-bit 2's compliment number in the range of [-1, 1] and said corrected phase signal is produced by taking a 2's complement addition using said bounded phase signal, wherein said phase difference signal is produced using said corrected phase signal. (See paragraphs 8-9, including table 2)

Re claim 12, Wildhagen further discloses a method for processing sample information for an input signal to generate a phase signal from an unwrapped phase difference signal for inputting into a phase modulator, said method comprising the steps of: receiving said sample information (See fig. 10: element 2 & paragraph 3); determining an n-bit 2's compliment number in the range of [-1, 1] from said sample information and producing a wrapped phase signal for said sample (See fig. 10: the output of element 4 & paragraph 5. Furthermore, this limitation has already been addressed in claim 2 above.); and determining said unwrapped phase difference signal by taking a 2's compliment subtraction using said wrapped phase signal. (See fig. 10: the output of element 7 & paragraphs 7-8 & fig. 1: the output of element 6.)

Re claim 13, Wildhagen further discloses wherein said wrapped phase signal produced by using a CORDIC processor. (See fig. 10: the output of element 4 & see paragraph 5.)

Re claim 14, Wildhagen further discloses correcting said wrapped phase signal to produce a corrected phase signal. (See paragraphs 8-9, including table 2.)

Re claim 15, Wildhagen further discloses that wherein said corrected phase signal is produced by taking a 2's complement addition using said wrapped phase signal, and wherein said unwrapped phase difference signal is produced using said corrected phase signal. (See paragraphs 8-9, including table 2. Furthermore, the

corrected signal correspond to the unwrapped signal when the wrapped signal is within [-Π,Π) or [-1, 1].)

Re claim 16, Wildhagen further discloses that wherein said sample information is in the form of one or more selected from the group consisting of in-phase and quadrature information and magnitude and phase information. (See fig. 10: the output of the IQ-generation 3.)

Re claim 17, Wildhagen further discloses that an apparatus for processing an electromagnetic input signal comprising processing circuitry producing a bounded phase signal from said input signal (see fig. 10: output of element 4) and producing an unwrapped phase difference signal from said bounded phase signal. (See fig. 10: the output of element 6.)

Claim 18 is an apparatus claim corresponding method claim 2. Hence, the steps in method clam 2 would have necessitated the elements in apparatus claim 18. Therefore, claim 18 has been analyzed and rejected w/r to claim 2.

Claim 19 is an apparatus claim corresponding method claim 3. Hence, the steps in method clam 3 would have necessitated the elements in apparatus claim 19. Therefore, claim 19 has been analyzed and rejected w/r to claim 3.

Claim 20 is an apparatus claim corresponding method claim 4. Hence, the steps in method clam 4 would have necessitated the elements in apparatus claim 20. Therefore, claim 20 has been analyzed and rejected w/r to claim 4.

Claim 21 is an apparatus claim corresponding method claim 5. Hence, the steps in method clam 5 would have necessitated the elements in apparatus claim 21. Therefore, claim 21 has been analyzed and rejected w/r to claim 5.

Re claim 22, Wildhagen further discloses that wherein said processing circuitry includes one or more digital signal processors incorporating a CORDIC processor. (See fig. 10: element 4. Furthermore, it is inherent that CORDIC processor is comprised of several digital signal processor.)

Re claim 23, Wildhagen further discloses that wherein said digital signal processors is located on an ASIC chip. (It is inherent that DSP chips are placed on an application specific integrated chip. Furthermore, One skilled in the art would know that chips are made of semiconductors materials, and that nowadays all processors are placed/located inside a chips that contain semiconductors properties.)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims (6-11 & 24-32) are rejected under 35 U.S.C. 103(a) as being unpatentable over Wildhagen (EP 0940958 A1), as applied to claim 1, in view of Jackson et al (hereinafter Jackson) (US Patent 6,975,687 B2), and further in view of Marvin A. Schofield et al (hereinafter Schofield), "Fast Phase unwrapping algorithm for interferometric applications", Optics Letters / Vol. 28, No. 14 / July 15, 2003.

Re claim 6, Wildhagen discloses a method for processing sample information for an input signal to generate a phase signal from an unwrapped phase difference signal for inputting into a phase modulator, said method comprising the steps of: receiving said sample information (In Wildhagen, see fig. 10: 2 & paragraph 3); and producing a wrapped phase signal for said sample (In Wildhagen, see fig. 10: the output of element 4); and determining said unwrapped phase difference signal by: determining the difference between said wrapped phase signal and another wrapped phase signal produced from a previous sample and producing a wrapped phase difference signal (In

Wildhagen, see fig. 10: the output of element 7 & paragraph 7); and wherein said unwrapped phase difference signal is said wrapped phase difference signal when said wrapped phase difference signal is less than or equal to Π (In Wildhagen, see paragraph 9 & 22, where he discloses that if the argument range is within a fixed point [-Π,Π], then it is safe to say that wrapped phase difference is <= Π.).

But the reference of Wildhagen fails to specifically disclose scaling said sample information. However, Jackson does. (See fig. 3: element 41) Jackson discloses an QPSK modulator that is comprised of a splitter circuit, two FIR filters for receiving the I & Q data, an arctan look-up table, a differentiator, and a scaler.

Taking the combined teachings of Wildhagen & Jackson as a whole, it would have been obvious to one of ordinary skill in the art to have incorporated a scaler into the system of Wildhagen in the manner as claimed, and as taught by Jackson, for the benefit of pre-distorting the output of the differentiator so as to compensate for the effects of the synthesizer. (In Jackson, see col. 5, lines 50-54)

The combination of Wildhagen & Jackson, as discussed above, shows the limitations claimed, except they do not specifically disclose said unwrapped phase difference signal is said wrapped phase difference signal plus the sign of said another wrapped phase signal multiplied by 2Π otherwise.

However, Schofield does. (See first page, left column.) Schofield discloses a fast phase unwrapping algorithm for interferometric applications. In this reference Schofield teaches that discontinuities are unwrapped by simply adding an appropriate integer multiple of 2Π to each pixel element of the wrapped phase map.

Taking the combined teachings of Wildhagen, Jackson & Schofield as a whole, it would have been obvious to one of ordinary skill in the art to have included this formula into the algorithm of the system of Wildhagen, modified by Jackson, as taught by Schofield, for the benefit of precluding discontinuities caused by 2Π jumps and, thus, providing a smoother waveform.

Re claim 7, the combination of Wildhagen, Jackson & Schofield further discloses that wherein said wrapped phase signal is an n-bit 2's compliment number in the range of [- 1, 1] produced by using a CORDIC processor. (In Wildhagen, see fig. 10: element 4 & see paragraph 6.)

Re claim 8, the combination of Wildhagen, Jackson & Schofield further discloses that wherein said unwrapped phase difference signal is produced by taking a 2's compliment subtraction using said wrapped phase signal. (In Wildhagen, see paragraph 7.)

Re claim 9, the combination of Wildhagen, Jackson & Schofield further discloses that correcting said wrapped phase signal to produce a corrected phase signal. (In Wildhagen, see paragraphs 8-9, including table 2.)

Re claim 10, the combination of Wildhagen, Jackson & Schofield further discloses that wherein said wrapped phase signal is an n-bit 2's compliment number in the range of [-1, 1] (In Wildhagen, see paragraph 6) and said corrected phase signal is produced by taking a 2's complement addition using said wrapped phase signal (In

Wildhagen, see paragraph 9), and wherein said unwrapped phase difference signal is produced using said corrected phase signal. (In Wildhagen, see table 2 & paragraph 22)

Re claim 11, the combination of Wildhagen, Jackson & Schofield further discloses that wherein said sample information is in the form of one or more selected from the group consisting of in-phase and quadrature information and magnitude and phase information. (In Wildhagen, see fig. 10: element 3)

Re claim 24, the motivation for combining these references has already been established in claim 6 above, therefore, the combination of Wildhagen, Jackson & Schofield further discloses that a signal transmitter comprising: baseband processing circuitry for processing an input signal to generate sample information containing amplitude and phase sample information for said input signal (In Wildhagen, see fig. 10: element 3 & paragraph 3); phase processing circuitry for receiving said phase sample information determining a wrapped phase signal for said phase sample information using an n-bit 2's compliment number in the range of [-1, 1] (In Wildhagen, see fig. 10: element 4 & paragraph 6.); determining an unwrapped phase difference signal by taking a 2's compliment subtraction using said wrapped phase signal and another wrapped phase signal from previous phase sample information (In Wildhagen, see paragraph 7.); determining a phase signal from said unwrapped phase difference signal; (In Wildhagen, see paragraph 7.) phase modulating circuitry for modulating a carrier wave using said phase signal to produce a phase modulated signal (In Jackson, see fig. 3:

element 81 & see col. 5, line 63-67.); and amplifying circuitry for regulating said phase modulated signal using said amplitude sample information to generate an output signal for transmission by said transmitter. (In Jackson, see fig. 3: element 80 & col. 8, lines 8-11.)

Claim 25 is an apparatus/transmitter claim corresponding method claim 10. Hence, the steps in method clam 10 would have necessitated the elements in apparatus/transmitter claim 25. Therefore, claim 25 has been analyzed and rejected w/r to claim 10.

Re claim 26, the combination of Wildhagen, Jackson & Schofield further discloses that wherein said phase processing circuitry includes one or more digital signal processors incorporating a CORDIC processor. (In Wildhagen, see fig. 10: element 4. Furthermore, One skilled in the art would know that CORDIC processor is comprised of several digital signal processors.)

Re claim 27, the combination of Wildhagen, Jackson & Schofield further discloses that wherein said digital signal processors is located on an ASIC chip. (One skilled in the art would know that chips are made of semiconductors materials, and that nowadays all processors are placed/located inside a chips that contain semiconductors properties.)

Re claim 28, the combination of Wildhagen, Jackson & Schofield further discloses that wherein said phase modulating circuitry includes a sigma delta modulator (In Jackson, see fig. 2: 32) and a phase locked loop to modulated said carrier wave using said phase signal. (In Jackson, see fig. 3: 33 & col. 5, line 12.)

Re claim 29, the combination of Wildhagen, Jackson & Schofield further discloses that wherein said amplifying circuitry comprises a plurality of segments. (In Jackson, see fig. 3: element 80)

Re claim 30, the combination of Wildhagen, Jackson & Schofield further discloses that wherein one or more of said segments is independently controlled as a power amplifier by at least a portion of said amplitude sample information to contribute power to said output signal. (In Jackson, see fig. 3: elements 80 & 31, & col. 4, lines 22-33.)

Re claim 31, the combination of Wildhagen, Jackson & Schofield further discloses a combining circuit for combining said power from said segment to generate said output signal (In Jackson, see fig. 3: elements 80 & 31, & col. 4, lines 22-33.), said combining circuit comprising one or more selected from the group consisting of power transformers, quarter-wave transmission lines, discrete LC components, and a Pi-networks. (One skilled in the art would know that combining circuits are comprised of

these elements. Therefore, it would have necessitated these components in order to combine power to the amplifier to generate the output signal.)

Re claim 32, the combination of Wildhagen, Jackson & Schofield further discloses that wherein one or more of said segments is independently controlled as a current source by at least a portion of said amplitude sample information to contribute current to an output signal. (In Jackson, see fig. 3: element 80. One skilled in the art would know that current sources are found in most amplifier.)

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Jarle Strand et al., *"Two-Dimensional Phase Unwrapping Using Robust Derivative Estimation and Adaptive Integration"*, IEEE Transactions On Image Processing, VOL. 11, NO. 10, October 2002.

Emmanuel Trouve et al., *"Improving Phase Unwrapping Techniques by the Use of Local Frequency Estimates"*, IEEE Transactions On Geoscience and Remote Sensing", VOL. 36, NO. 6, November 1998.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Flores whose telephone number is 571-270-1201. The examiner can normally be reached on Mon-Fri 7-5pm Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LF
February 5, 2007

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